Claims

1. An electrode for use in energy storage comprising:

(a) a nanostructured, mesoporous electrically conductive metal oxide; and

(b) an ultrathin, conformal polymer coating on the metal oxide;

wherein said electrode has a mesoporous structure.

2. The electrode of claim 1 wherein said metal oxide is selected from the group consisting of manganese oxides, vanadium oxides, nickel oxides, iron oxides, and physical or compositional mixtures thereof.

3. The electrode of claim 1 wherein said polymer coating is based on an arylamine monomer.

4. The electrode of claim 1 wherein said polymer coating is selected from the group consisting of *o*-phenylenediamine, aniline, and mixtures thereof.

5. The electrode of claim 1 wherein said polymer coating is deposited electrochemically on said metal oxide.

6. The electrode of claim 1 wherein said polymer coating is less than 10-nm thick.

7. A method for making an electrode for use in energy storage, comprising the steps of:

(a) preparing a nanostructured, mesoporous metal oxide film; and

(b) depositing a polymer coating on the metal oxide film;

wherein said electrode has a mesoporous structure.

8. The method of claim 7 wherein said metal oxide is selected from the group consisting of manganese oxides, vanadium oxides, nickel oxides, iron oxides, and physical or compositional mixtures thereof.

9. The method of claim 7 wherein said polymer coating is based on an arylamine monomer.

10. The method of claim 7 wherein said polymer coating is selected from the group consisting of *o*-phenylenediamine, aniline, and mixtures thereof.

11. The method of claim 7 wherein said polymer coating is deposited electrochemically on said metal oxide.

12. The method of claim 7 wherein said polymer coating is less than 10-nm thick.